NATIONAL TRANSPORTATION SAFETY BOARD
Investigative Hearing
US Army PAT25, Sikorsky UH-60L and
PSA Airlines flight 5342
MHI RJ Aviation CL-600-2C10 (CRJ700), N709PS
Midair Collision in Washington, DC
January 29, 2025

Docket No.	**SA-544**
EXHIBIT	
7-AIR-A	

Airplane Structures Group Chairman's Factual Report

(26 Pages)

National Transportation Safety Board
Office of Aviation Safety
Washington, DC 20594

DCA25MA108

STRUCTURES

Group Chair's Factual Report

April 23, 2025

A ACCIDENT

Location:	Washington, District of Columbia
Date:	January 29, 2025
Time:	2048 Eastern Standard Time 0148 Coordinated Universal Time (UTC) January 30, 2025
Airplane:	PSA Airlines flight 5342, MHI [Mitsubishi Heavy Industries] RJ Aviation (Bombardier) CL-600-2C10 (CRJ700), N709PS
Helicopter:	US Army PAT25, Sikorsky UH-60L Black Hawk, 00-26860

B STRUCTURES GROUP

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C DETAILS OF THE INVESTIGATION

On January 29, 2025, about 2048 eastern standard time (EST), a Sikorsky UH-60L operated by the US Army under the callsign PAT25, tail number 00-26860, and PSA Airlines flight 5342, a MHI [Mitsubishi Heavy Industries] RJ Aviation (Bombardier) CL-600-2C10 (CRJ700), N709PS, collided in flight approximately 0.5 miles southeast of Ronald Reagan Washington National Airport (DCA), Arlington, Virginia, and impacted the Potomac River in southwest Washington, DC. The major wreckage of both aircraft was recovered from the river between January 29 and February 9, 2025, and transported to Hangar 7 at DCA. Smaller wreckage was recovered and delivered to the airport through June 2025. The details of the recovery are documented in the Recovery Group Chair's Factual Report in the public docket for this accident. The group examined the recovered wreckage in Hangar 7 from January 30 to February 11, 2025.

D FACTUAL INFORMATION

1.0 Accident Site

The wreckage of both aircraft were located in the Potomac River in depths ranging from 1 to 8 feet depending on location and tidal conditions (Figure 1). The helicopter wreckage was about 3,730 feet southeast of the approach end of runway 33 at 38.840951° N, 77.025571° W and included most of the major structure. The airplane was fragmented into several pieces centered about 2,345 feet southeast of the approach end of runway 33 at 38.844623° N, 77.027306° W. The outboard left wing was recovered away from the CRJ700 main wreckage about 2,790 feet southeast of the approach end of runway 33 at 38.84363405° N, 77.02639705 W.

Figure 1. DCA25MA108 Wreckage Diagram

2.0 Airplane Information

The MHI RJ CRJ700 airplane is a twin-engine, narrow-body, transport category, regional jet airplane originally certified in 2001 (Figure 2). The airplane is equipped with a T-tail and retractable tricycle landing gear. The airplane is 106 feet, 7 inches long, 24 feet, 6 inches tall at the tail, has a fuselage diameter of 8 feet, 10 inches, has a wingspan of 76 feet, 3 inches, and has a horizontal stabilizer span of 28 feet. The airplane primary and secondary wing, fuselage, and tail structure is of all metal construction, primarily aluminum alloys. The accident airplane, SN 10165, was delivered new to PSA Airlines on January 25, 2005.

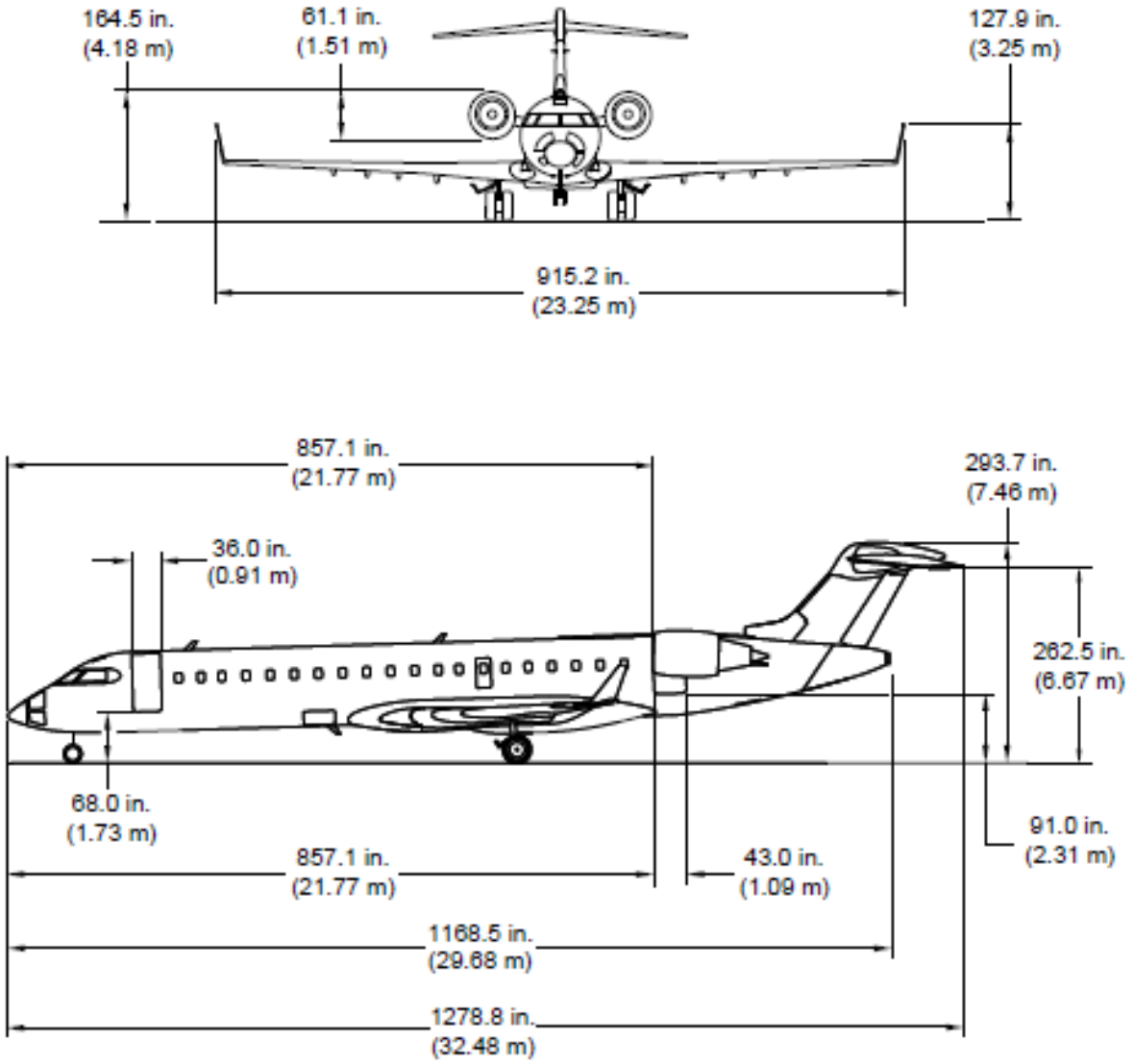

Figure 2. CRJ700 drawing (provided by MHI RJ)

Locations on the airplane are defined in terms of stations that identify specific reference planes or lines on the airplane. All stations, reference planes, and lines are measured in inches from the specified reference point. Fuselage stations (FS) define locations along the longitudinal axis, buttock lines (BL) define locations along the lateral axis, and water lines (WL) define locations along the vertical axis. The FS origin (FS0.00) is located 144.00 inches forward of the nose of the airplane, the BL origin (BL0.00) is located at the lateral centerline of the airplane, and the WL origin (WL0.00) is located 97.50 inches below the lateral centerline of the fuselage. FS reference planes are measured at right angles to the centerline of the fuselage along the airplane longitudinal axis (Figure 3). The fuselage stations generally coincide with frame locations in the fuselage.

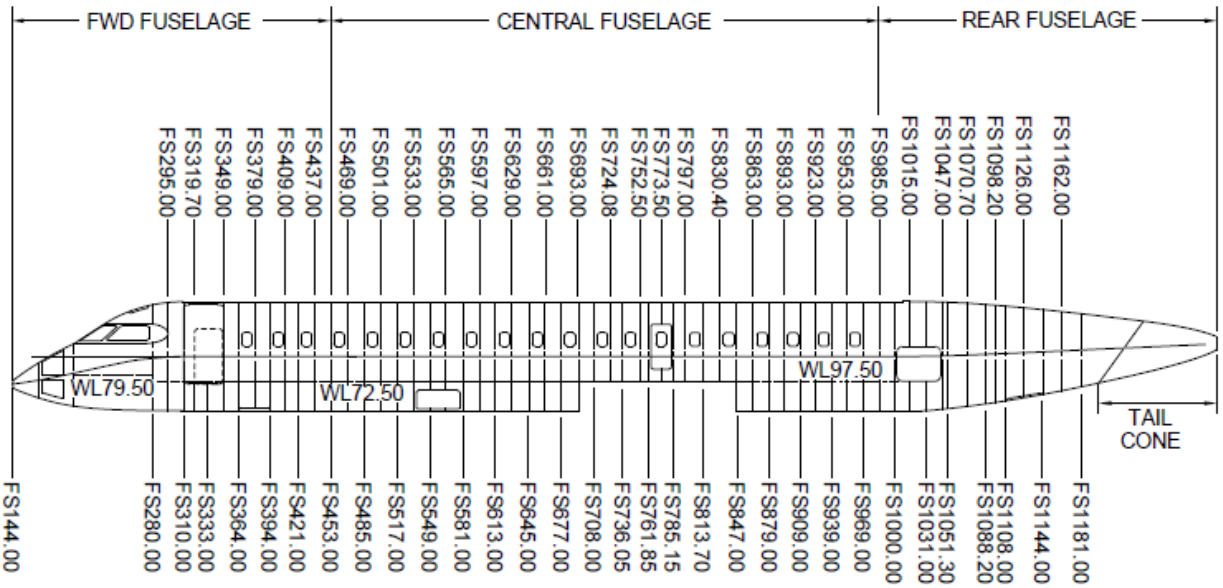

Figure 3. CRJ700 fuselage station diagram

Fuselage stringer (S) locations are measured circumferentially around the fuselage from the upper centerline of the fuselage at S-0 to the lower centerline of the fuselage at S-27. Stringer locations are identified with an L for those on the left side of the airplane and an R for those on the right side of the airplane. The fuselage centerline is located at BL0.00 and WL97.50 (Figure 4).

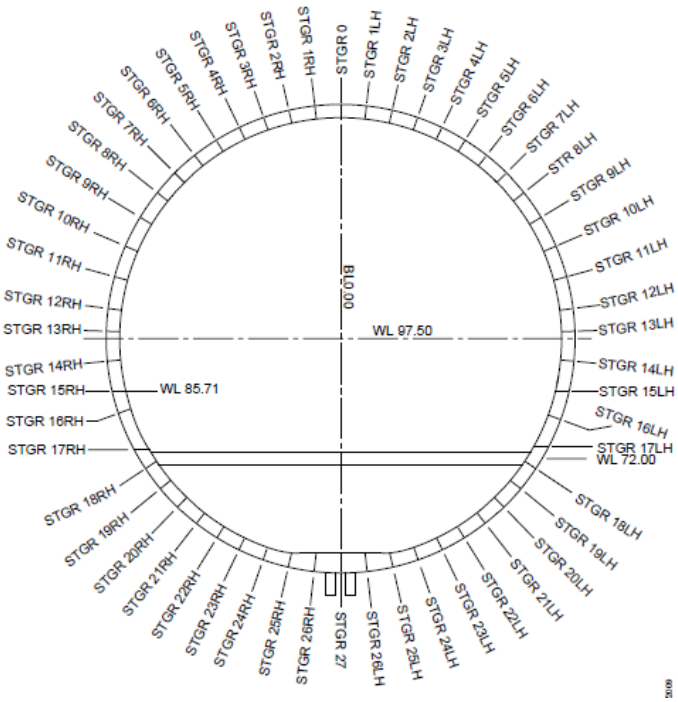

Figure 4. CRJ700 fuselage stringer diagram (provided by MHI RJ)

Wing stations (WS) are reference planes parallel to the airplane longitudinal axis (Figure 5). The WS origin (WS0.00) is located 36.00 inches outboard of the centerline of the airplane at BL36.00. The wing stations generally align with wing rib locations.

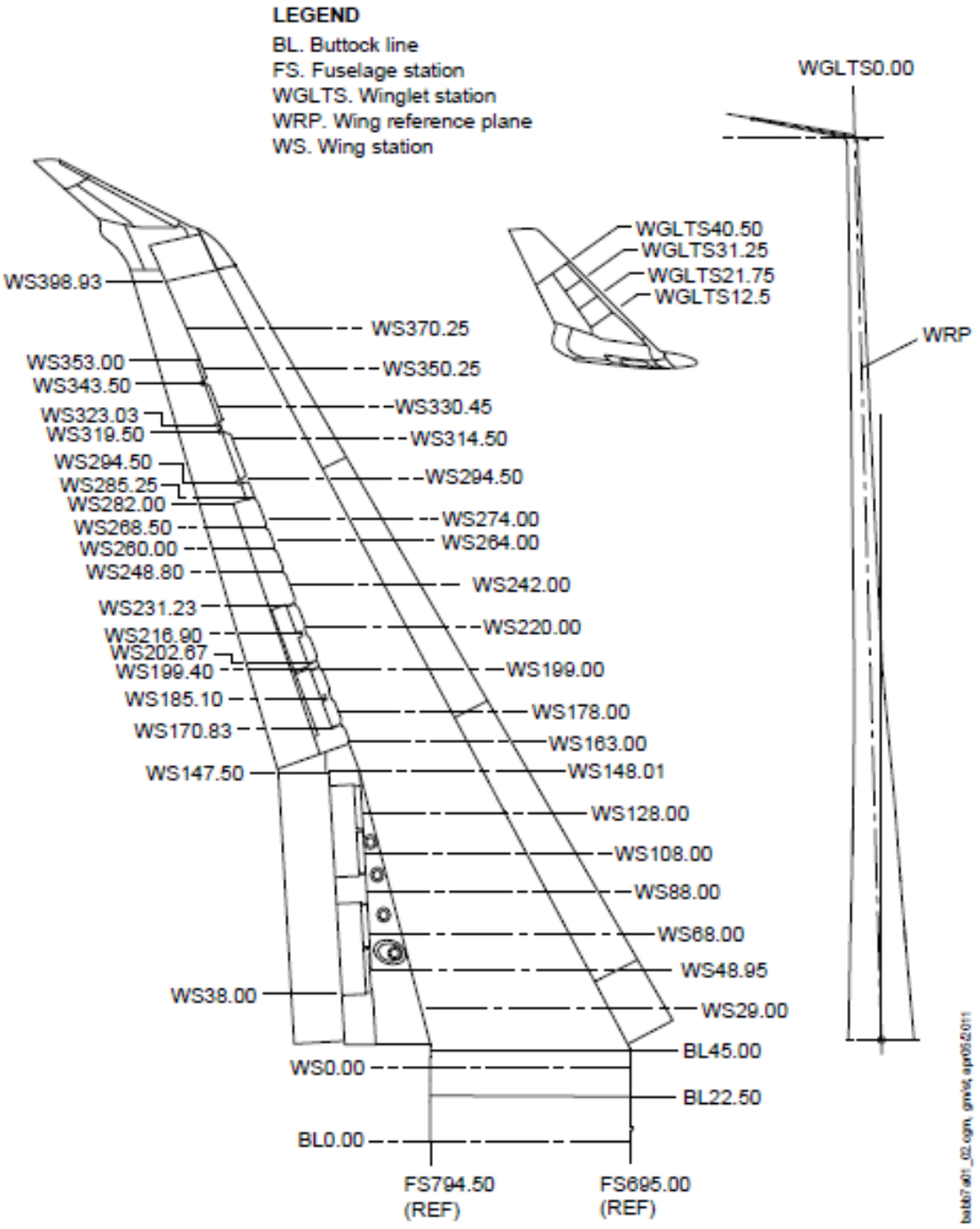

Figure 5. CRJ700 wing station diagram (provided my MHI RJ)

Vertical stabilizer stations (VSS) are reference planes oriented at right angles to the centerline of the vertical stabilizer rear spar (Figure 6). The VSS origin (VSS0.00) is located at the intersection of the rear spar centerline and WL102.50.

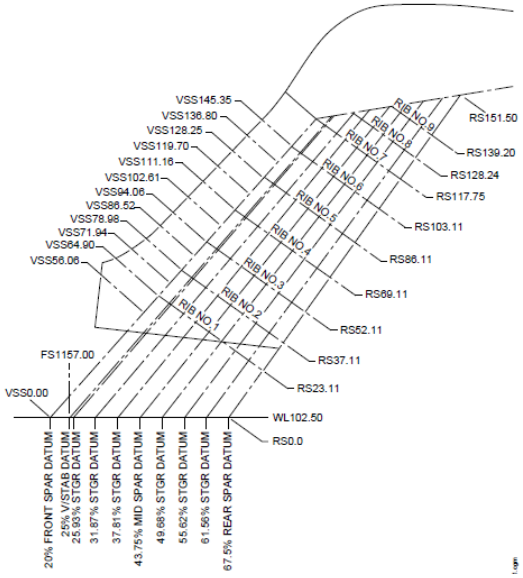

Figure 6. CRJ700 vertical stabilizer station diagram (provided by MHI RJ)

Horizontal stabilizer locations are reference planes oriented at right angles to the centerline of the horizontal stabilizer 62% rear spar and aligned with the numbered ribs (Figure 7).

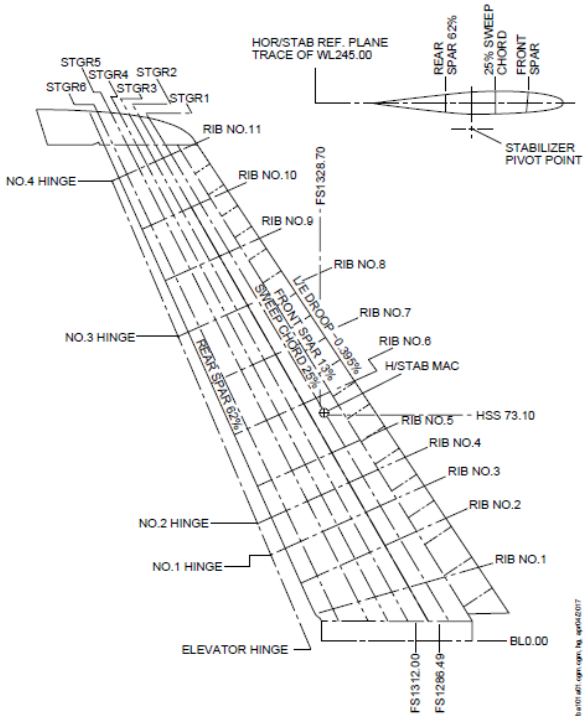

Figure 7. CRJ700 horizontal stabilizer diagram (provided by MHI RJ)

3.0 Wreckage Examination

Surveillance videos obtained by the NTSB showed the collision between the aircraft and their descent to the water. Immediately after the collision, the outboard left wing separated from the CRJ700, and the airplane rolled left about 450° before water impact. The CRJ700 impacted the water in a nose-down attitude (about 45°) with a left roll about 90°. The CRJ700 had extensive water impact damage to most of the structure. The group focused on identifying the largest pieces of structure and individual damage signatures that could have been caused by the mid-air collision. The recovered wreckage consisted of all the major structural items of the airplane and was estimated to encompass more than 90% of the components.

3.1 *Safety*

In the days before the wreckage was recovered PSA Airlines provided the group with a list of all hazardous items on board the airplane and their locations. Items included 5 portable fire extinguishers, 2 engine fire bottles with squibs, the Auxiliary Power Unit (APU) fire bottle with squib, 2 cargo fire bottles with squibs, the hydraulic accumulator, numerous passenger oxygen generators, the forward flight attendant oxygen generator, the aft flight attendant oxygen generator, the aft lavatory oxygen generator, the lavatory fire extinguisher, the crew oxygen cylinder, 2 portable oxygen cylinders, 4 protective breathing equipment (PBE) kits, the main battery, the APU battery, 2 automatic emergency defibrillators, 2 emergency medical kits, the Emergency Locator Transmitter (ELT) battery, 4 MLG tires, and 2 NLG tires.

Sikorsky provided the group with a list of hazardous items on board the helicopter and their locations. Items included 2 cartridge actuated devices (CAD), one each on the outboard pod fuel tanks, a CAD on the cargo hook, 2 engine fire bottles with squibs, a NiCad battery, the hydraulic accumulator, 2 main landing gear tires, and 1 tailwheel tire.

The airplane tire pressures were measured, and the tires were made safe by deflating them while still on the recovery barge. The hydraulic accumulators were deemed safe due to the multiple breaches of the hydraulic systems on both aircraft. As wreckage was brought into hangar 7, the group allowed a specialist from PSA Airlines and the US Army access to remove and/or safe any hazardous items before other investigators could access the wreckage.

The CRJ700 crew oxygen cylinder was recovered depressurized with the valve fractured off. The 2 portable oxygen cylinders were depressurized. A total of 20 oxygen generators were recovered, 16 generators were expended and 4 were made safe by installing safety pins. The fire bottles were made safe by installing safety caps. The 4 PBEs, 5 fire extinguishers, 20 oxygen generators, and 2 portable oxygen cylinders were segregated and placed in a metal storage container for transport. The

ELT was disconnected and removed from the wreckage. The main battery was removed and placed in a battery shipping container.

The Black Hawk tire pressures were measured and then depressurized when the wreckage arrived at the hangar. The CADs were removed and placed into a metal storage container. The engine fire bottles were inspected and found to be depressurized.

3.2 Fuselage

The manufacturer defines three main fuselage sections; forward, central, and rear (see Figure 3). The forward fuselage spans from the nose of the airplane at FS 144 to FS 453 and includes the cockpit, nose landing gear (NLG), forward pressure bulkhead, L1 main cabin door, R1 service door, the avionics bay, and 3 passenger windows on each side. The central fuselage spans from FS 453 to FS 985 and includes the forward cargo door, both overwing emergency exits, the center wing area, most of the wing-to-body fairing, and 16 passenger windows on each side. The rear fuselage spans from FS 985 to the tip of the tail cone and includes the aft cargo door, both pylons and engines, the aft pressure bulkhead, APU, APU access doors, vertical stabilizer, and aft equipment bay door.

3.2.1 Forward Fuselage

The recovered forward fuselage structure was severely crushed, deformed and fractured into multiple pieces consistent with water impact. The left side of the forward fuselage exhibited more significant damage than the right side. The cockpit and avionics bay wreckage were an entanglement of instruments, wires, avionics, flight controls, and structure. The cockpit windows and frames were recovered in two major pieces. One piece included the complete right side window and frame, the right windshield upper and aft frames, about 7 inches of fuselage below the frames, and the crown structure above the frames. The right side window inner pane was fractured, and the center and outer panes were intact. The other piece included the right windshield center and lower frames, the left windshield and frame, and the left side window frame. The left side window was separated. The right windshield, left windshield, and left side window had all 3 glass panes fractured.

At least 10 larger identifiable pieces and numerous smaller pieces of the forward fuselage were examined that comprised almost the entirety of the forward fuselage. The fractured L1 passenger entry door, complete R1 service door, complete avionics bay door, mostly intact 3 right passenger windows, remnants of the 3 left passenger windows, forward pressure bulkhead, and NLG were identified in the recovered wreckage. The NLG was mostly intact and recovered in the extended position with the right, aft, and upper walls of the wheel well attached. The left wall of the wheel well was separated and recovered. The right and left trunnions were

disengaged due to the wheel well deformation. The NLG tires were intact and depressurized during recovery. The right NLG door was separated and recovered.

3.2.2 Central Fuselage

The recovered central fuselage structure was crushed, deformed, and fractured but was comprised of larger pieces than the forward fuselage. A large section of the central fuselage that spanned from FS 469 to the leading edge of the wing near FS 677 and from S-3L over the top and around the right side and bottom to S-17L was recovered in one piece. The section was crushed vertically down. The left side of the fuselage between FS 453 and FS 677 and between S-3L and S-17L was separated into multiple smaller pieces with more significant damage. The remnants of the 8 left and right passenger windows normally installed in this section were identified. Most of the forward end of the wing-to-body fairing was separated and recovered in two pieces. The forward cargo door remained installed.

The central fuselage above the wing center section remained attached to portions of the wings. A section of the right central fuselage that spanned from FS 677 to FS 847 and from WL72.5 to S-6R remained attached to the right wing. The 5 passenger windows and the right overwing emergency exit were intact and installed. A section of the left central fuselage that spanned from FS 727 to FS 847 and from WL 72.5 to S-10L forward of the emergency exit and from WL 72.5 to S-7L aft of the emergency exit remained attached to a section of the left wing center section. The left overwing emergency exit and the two windows aft of the exit were separated. The emergency exit frame was fractured. The fuselage crown structure, left side forward of the emergency exit, and left overwing emergency exit were separated and recovered.

A large section of the central and rear fuselage with significant crushing and deformation was recovered as a single piece but was cut into multiple pieces for transport. The section comprised the upper fuselage structure from FS 752 to FS 847, almost all the fuselage structure from FS 847 to FS 985, and the lower fuselage structure from FS 985 to FS 1144. The section included the upper portion of the left overwing emergency exit frame, most of the aft end of the wing-to-body fairing, the aft cargo door frame, and the aft equipment bay door. The aft cargo door and several smaller pieces of central fuselage were recovered separately.

There were two areas of damage noted to the lower right side of the wing-to-body fairing (Figure 8). The first was a puncture in the right side of the fairing about 10 inches by 8 inches centered near FS 923. The second was a slash through the lower surface of the fairing, internal structure, and lavatory access door about 29 inches long by 2 inches wide near FS 961 (Figure 9). The slash started about 12 inches inboard of the lavatory service door and continued through the door. An outboard section of helicopter tail rotor blade about 2 feet long was embedded in the fuselage structure at the slash near FS 961. The carbon fiber remnants of the

blade spar, damaged honeycomb blade skins, and the metallic leading edge were present on the embedded blade. The blade section was not able to be extracted from the structure. The aft portion of the lavatory access door was separated and not identified in the recovered wreckage. The slash was oriented about 25° from the lateral axis of the airplane and about 15 inches of the blade was protruding from the inner fuselage skin. The forward 9 inches of the lavatory service panel was still attached to the aircraft.

Figure 8. Right, aft wing-to-body fairing damage (ALPA photo)

Figure 9. Right, aft wing-to-body fairing slash damage and tail rotor blade (NTSB photo)

3.2.3 Rear Fuselage

The rear fuselage was fragmented into several pieces between FS 985 and FS 1088 and mostly intact from FS 1088 to the tip of the tail cone. The aft pressure bulkhead installed at FS 1088 was separated from the rear fuselage with portions of the fuselage attached around about half the circumference. A section of the left engine pylon remained attached to the bulkhead. A section of the right rear fuselage between FS 1000 and FS 1088 remained attached to the right pylon. The rear fuselage aft of FS 1144 was mostly intact with little damage. The APU remained installed, and the access doors were closed and latched. Most of the vertical stabilizer remained attached to the top of the rear fuselage.

3.3 Wing

The airplane is built with a one-piece swept back wing that has a wingspan of 76 feet, 3 inches. There are 3 leading edge slats, an inboard double slotted trailing edge flap, an outboard double slotted trailing edge flap, an aileron, and a winglet installed on each side.

3.3.1 Right Wing

The right wing was attached to a portion of the center section and fuselage and was mostly intact with the slats, flaps, aileron, winglet, and right main landing gear (RMLG) attached. The flaps and slats were in the full down position. The winglet tip, about 18.5 inches long, was fractured and hanging by some composite layers on scene but was separated during recovery. The wing was lifted by cables in a choke configuration at the wing root and between the inboard and outboard flaps which caused additional damage. The inboard slat between was partially connected and bent under the wing. The center slat was attached but bent downwards centered near right WS 247. The outboard slat was undamaged.

The inboard flap was mostly intact and attached. The inboard aft corner was bent down and there was damage to the trailing edge centered about 74 inches from the inboard end that was aligned with the lift cable locations. The outboard flap was attached and undamaged. The right aileron was attached and undamaged.

The right half of the center wing tank was mostly intact and undamaged. Both the front and rear spars were fractured near left BL 18. About 65 inches of the LBL 22.5 rib remained attached to the section by the fuel lines. The RMLG was attached to the right wing and fuselage section and was in the extended position. The wheels and tires were intact, but the tires were deflated during recovery.

3.3.2 Left Wing

The inboard left wing between the centerline of the airplane at BL 0 and WS 178 was highly fragmented, deformed, and hydroformed consistent with water impact (Figure 10). Numerous pieces of the left wing upper skin, lower skin, spars, and ribs were identified in the recovered debris. A portion of the left side of the center wing tank was attached to the left overwing fuselage section. The section included portions of the rear spar, left main landing gear (LMLG) auxiliary spar, wing ribs, and upper and lower wing skins from WS 22.5 to WS 68 and from FS 773.5 to FS 847. The upper portion of the LMLG remained attached to the piece. The left inboard flap and attached hinge assembly was separated and recovered with about 15 inches of the outboard end missing. Three of the 4 hinge attach bolts were sheared and the fourth was missing.

Figure 10. Left wing inboard section (NTSB photo)

The left outboard wing from WS 178 to the tip was separated from the airplane and recovered in the debris field between the two main wreckage locations (Figure 11). The left winglet was fractured from the wing and recovered adjacent to the wing. The left outboard wing was mostly intact from WS 242 to the tip. There was crushing damage at the outboard end where the winglet separated. The left aileron and left outboard slat were attached and mostly undamaged. The outboard portion of the outboard flap, about 8 feet long, remained attached to the wing. The lower wing skin on the separated piece of left wing was deformed down about 90° between WS 178 and WS 242.

Figure 11. Left outboard wing (NTSB photo)

The inboard end of the left center slat had a linear slash mark about 52 inches long (Figures 12-14). The slash extended from the inboard end of the slat at WS 178 and 12.5 inches forward of the trailing edge to the trailing edge of the slat at WS 230. The slash was oriented about 100° from the slat rib rivet line. The slat skin aft of the leading edge of the slash was gouged and abraded linearly aftward. The portions of slat aft of the slash were not identified in the recovered debris. The wing forward spar aft of the slat was also cut along the same diagonal line and the interior wing structure was damaged and deformed aft and inboard. There were black paint transfer marks on the interior wing structure aft of the slash. The upper wing skin between WS 178 and WS 242 was separated and fractured into multiple smaller pieces.

Figure 12. Left wing center slat slash mark (NTSB photo)

Figure 13. Slash mark close-up (NTSB photo)

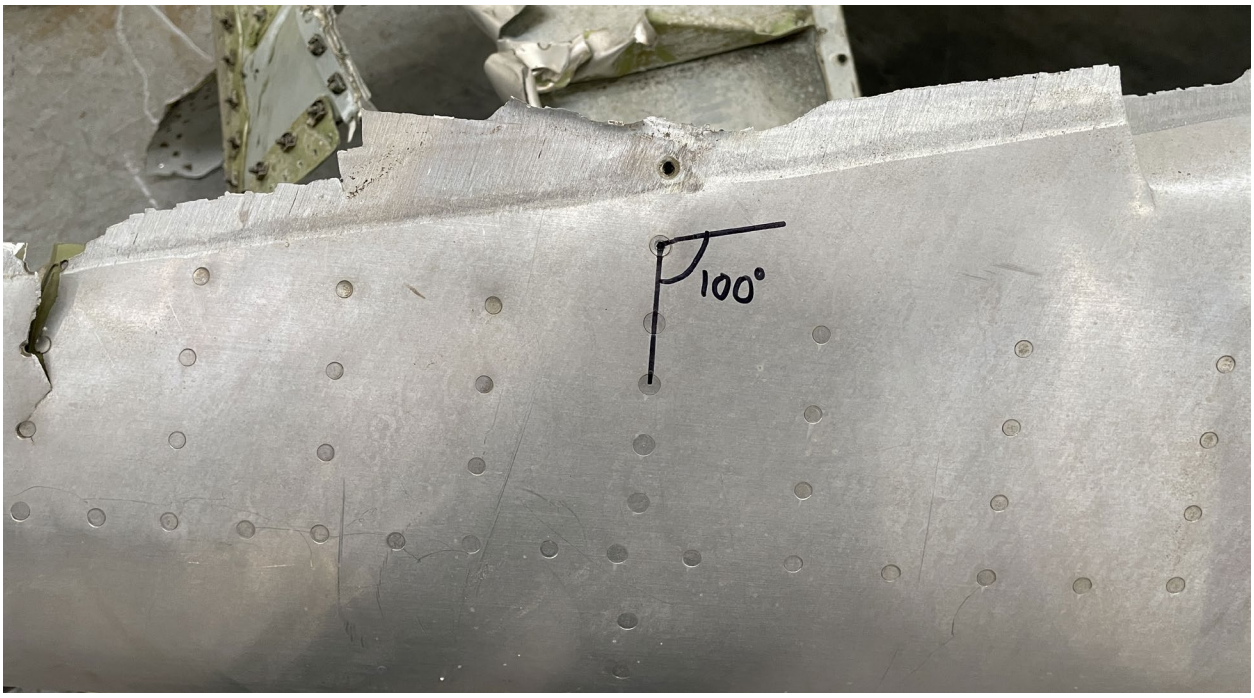

Figure 14. Slash mark close-up (NTSB photo)

A section of the left inboard slat inboard end, about 32 inches long, was recovered (Figures 15-16). There was a flattened impact area/dent on the lower portion of the slat that had black paint transfer marks. The paint transfer marks and denting began about 16 inches from the inboard end of the slat and continued for about 16 inches to the fractured outboard end of the piece. The width of the area was about 5 inches, and the transfer marks were oriented in an inboard/outboard direction.

Figure 15. Left inboard slat, inboard end (NTSB photo)

Figure 16. Inboard slat impact mark close-up (NTSB photo)

A section of the left inboard slat, about 37 inches long, was identified that was normally installed between about 60 and 97 inches from the inboard end of the slat (Figure 17). There was an impact impression on the lower portion of the slat with linear black paint transfer marks that began about 71 inches from the inboard end of the slat (Figure 18). The area was about 8 inches long by 6 inches wide. The marks were oriented about 45° from the slat rib rivet line. A section of slat was missing between about 79 and 87 inches outboard of the inboard end. A second area, about 10 inches long by 5.5 inches wide, continued from 87 inches from the inboard end to the fractured edge of the section (Figure 19). The second area terminated about 8 inches around the slat from the lower trailing edge. The slat section was crushed and fractured in multiple areas.

Figure 17. Left inboard slat section (NTSB photo)

Figure 18. Left inboard slat close-up (NTSB photo)

Figure 19. Left inboard slat close-up (NTSB photo)

The LMLG outer cylinder was fractured about 10 inches above the lower end and separated from the upper portion. The separated section included the inner cylinder, axle, brakes, wheels, and tires. The outboard tire had a diagonal slash through all the layers from rim to rim about 23 inches long (Figure 20). The inboard slash angle was about 50° from the longitudinal axis and the outboard slash angle was about 38° from the longitudinal axis. There was another area of damage on the outboard tire that was about 10.5 inches long and about 3 inches wide. The inboard

tire had a puncture area on the inboard side wall, about 7 inches by 3.5 inches, and a puncture area on the outboard side wall about 4 inches by 3 inches. The inboard tire, inboard rim was fractured with a piece of composite material embedded in the fracture.

Figure 20. LMLG outboard tire slash (ALPA photo)

3.4 Empennage

The vertical stabilizer and rudder remained attached to the rear fuselage section. The horizontal stabilizer and attached elevators separated from the top of the vertical stabilizer.

3.4.1 Vertical Stabilizer and Rudder

The ram air inlet was separated from the base of the vertical stabilizer. The vertical stabilizer leading edge was separated from the 20% front spar from the base to rib 6. There was damage noted on the aft portion of the leading edge between VSS 71.94 and VSS 102.61. The vertical stabilizer was fractured along rib 6 aft to the 37.81% stringer then down along the 37.81% stringer to rib 5, then aft to the 67.5% rear spar. The 20% front spar and 25% front spar were deformed to the left at the fracture point. The locations of the spars are defined by the manufacturer as shown in Figure 6.

The rudder was attached to the vertical stabilizer and mostly intact. The upper portion of the rudder was bent to the left between rib 5 and rib 6. The right rudder skin at the bend area was fractured. The left and right rudder skins were fractured from the trailing edge forward about 13 inches, about 80.5 inches above the base. Some skin punctures were noted adjacent to the fracture.

3.4.2 Horizontal Stabilizer and Elevators

The horizontal stabilizer was separated from the airplane with a section of the vertical stabilizer and the elevators attached. The upper portion of the vertical stabilizer remained attached to the bottom of the horizontal stabilizer and the fractures matched those described above. The bullet fairing and spar were separated and recovered and exhibited crush damage to the right. The upper skull cap fairing was separated and not identified in the recovered wreckage. The upper rudder hinge remained intact, and the rudder side of the hinge was pulled from the rudder.

The right side of the horizontal stabilizer was mostly intact with the right elevator installed. The trailing edge of the right elevator was damaged from recovery. There was light scoring and gouging noted to right stabilizer leading edge from the root outboard about 12 inches. There was a dent in the leading edge about 14 inches long with linear black and white paint transfer marks and scoring. The dent transitioned to a puncture about 11 inches long by 11 inches wide with the leading edge skins curled downward. The dent and puncture were located between rib 1 and rib 2.

The left side of the horizontal stabilizer and elevator were partially intact. The leading edge of the left horizontal stabilizer was fractured from the front spar along the entire length. The outboard half of the left horizontal stabilizer was crushed and deformed aft from Rib 5 to the outboard end. There were several vertically oriented gouges on the forward side of the front spar web from about 5 inches from the root end out to rib 6. The gouges were spaced about 1.75 inches apart. The upper and lower spar cap flanges on the front spar were fractured and separated with some areas having a shiny, smeared appearance. The front spar was mostly intact from the root to rib 6 and missing from rib 6 to the outboard end. The outboard tip of the left horizontal stabilizer was missing. The upper and lower skins on the left horizontal stabilizer were splayed open from Rib 1 to the outboard end. The left horizontal stabilizer leading edge was separated in one piece and mostly intact. The inboard half was crushed downward and twisted and the fractured spar cap flanges remained attached to the separated leading edge. The stabilizer front spar from Rib 6 outboard remained attached to the separated leading edge. The leading edge attach screws were spaced about 1.75 inches apart.

The left elevator was mostly intact and attached to the horizontal stabilizer from the inboard root to the center hinge at Rib 8. The outboard hinge was intact but fractured from the stabilizer rear spar. The elevator was splayed open at the leading

edge from Rib 8 to the outboard end. There was aft crushing along the outboard half of the left elevator. There was some damage to the left elevator inboard trailing edge from recovery.

3.5 Engines and Pylons

The right engine was recovered mostly intact with the entire pylon attached. A section of the aft engine FS 1051 frame about 66 inches long was attached to the pylon. A section of fuselage skin spanning from FS 1000 to FS 1088 was attached to the pylon. The fuselage section spanned from S-11R to S-14R between FS 1000 and FS 1051, S-11R to S-17R between FS 1051 and FS 1070, and S-11R to S-14R between FS 1070 and FS 1088. The lower right engine cowling was installed. About 25% of the upper right engine cowling was not identified.

The left engine was recovered with the core mostly intact but had sustained significantly more damage than the right engine. The inlet was separated and about 60% of the lip skin was recovered mostly flattened. The acoustic liner portion of the left engine inlet was not identified. Almost all the left engine cowling was separated and recovered in 6 pieces.

E TESTS AND RESEARCH

1.0 MHI RJ Damage Locations

MHI RJ was able to identify the wing-to-body fairing damage and left wing slat damage locations in the airplane coordinate system based on the physical measurements from the wreckage. The locations are referenced laterally to the airplane centerline (x-axis), vertically to a point located 97.5 inches below the center of the fuselage (y-axis), and longitudinally to a point located 144 inches forward of the nose (z-axis).

The slash with embedded tail rotor blade in the aft wing-to-body fairing was located as shown in Figures 21-23.

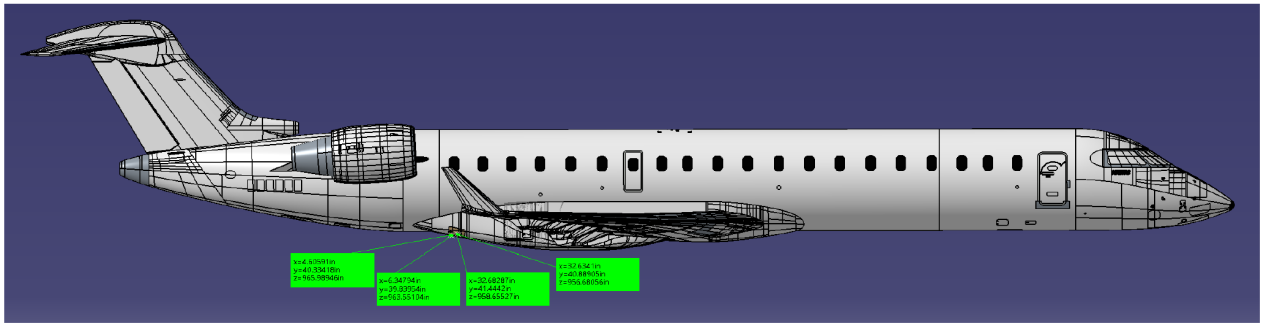

Figure 21. Aft fairing slash location, view looking at right side (MHI RJ diagram)

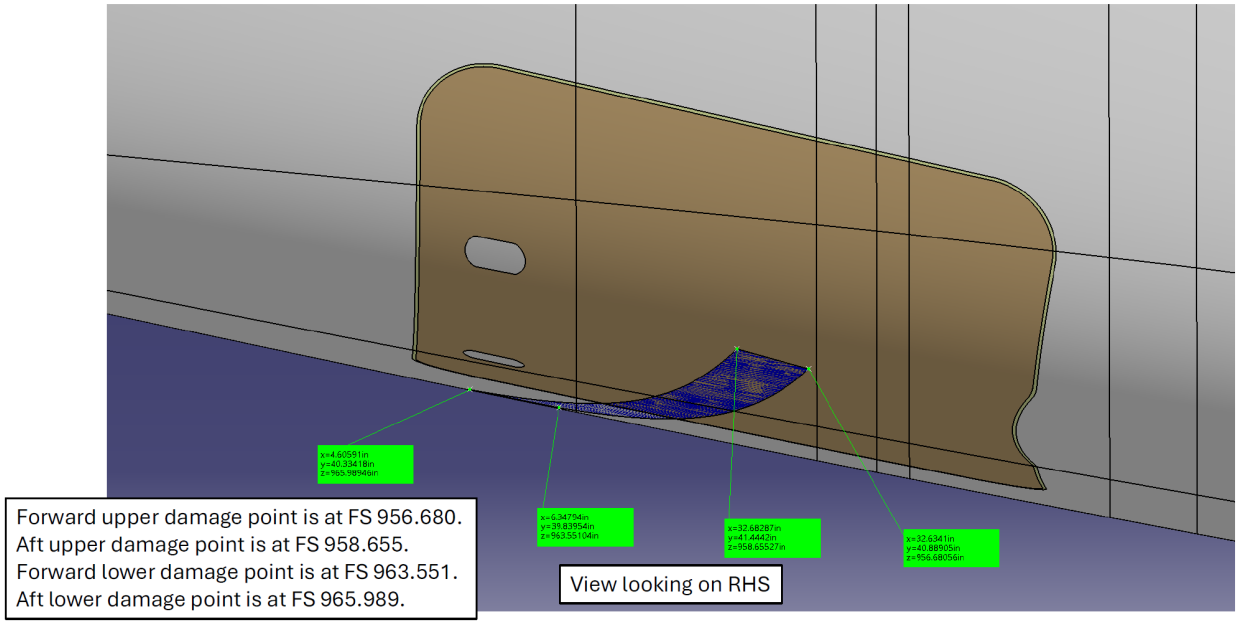
Forward upper damage point is at FS 956.680.
Aft upper damage point is at FS 958.655.
Forward lower damage point is at FS 963.551.
Aft lower damage point is at FS 965.989.
View looking on RHS

Figure 22. Aft fairing slash location close-up (MHI RJ diagram)

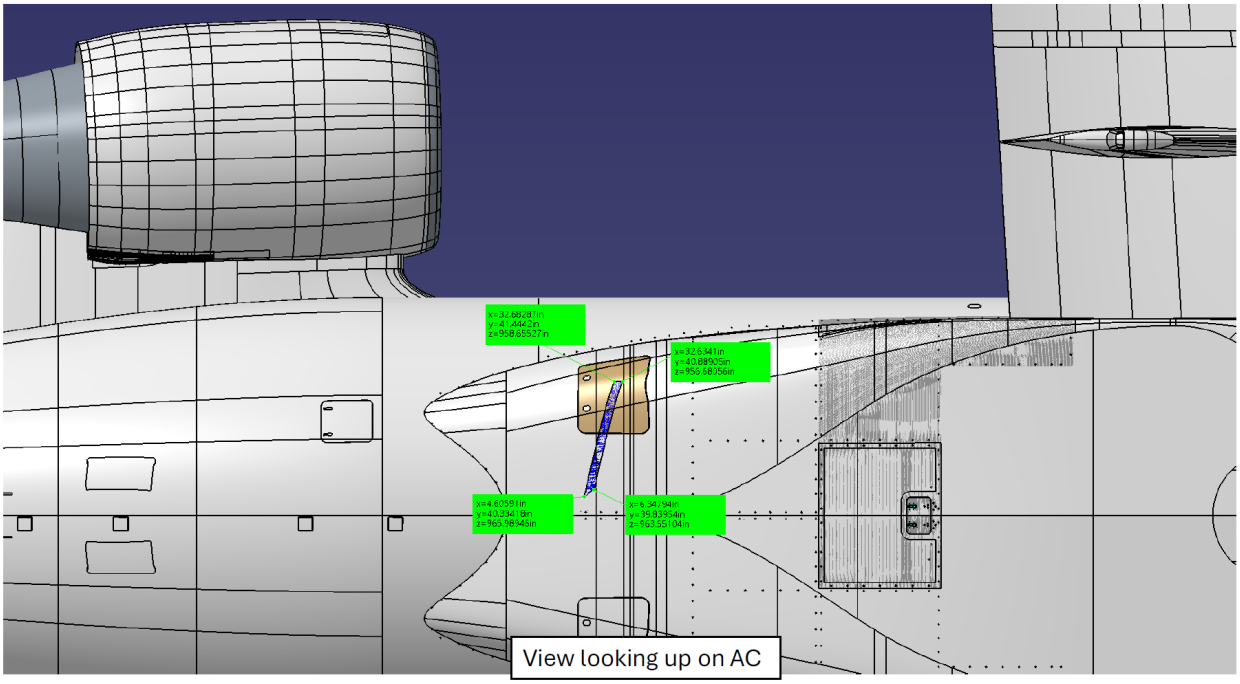

Figure 23. Aft fairing slash location, viewed looking up (MHI RJ diagram)

The slash mark on the left center slat was located as shown in Figure 24. The slash was oriented 51.8° from the YZ (BL) plane, 7.3° from the XZ (WL) plane, and 37.2° from the XY (FS) plane.

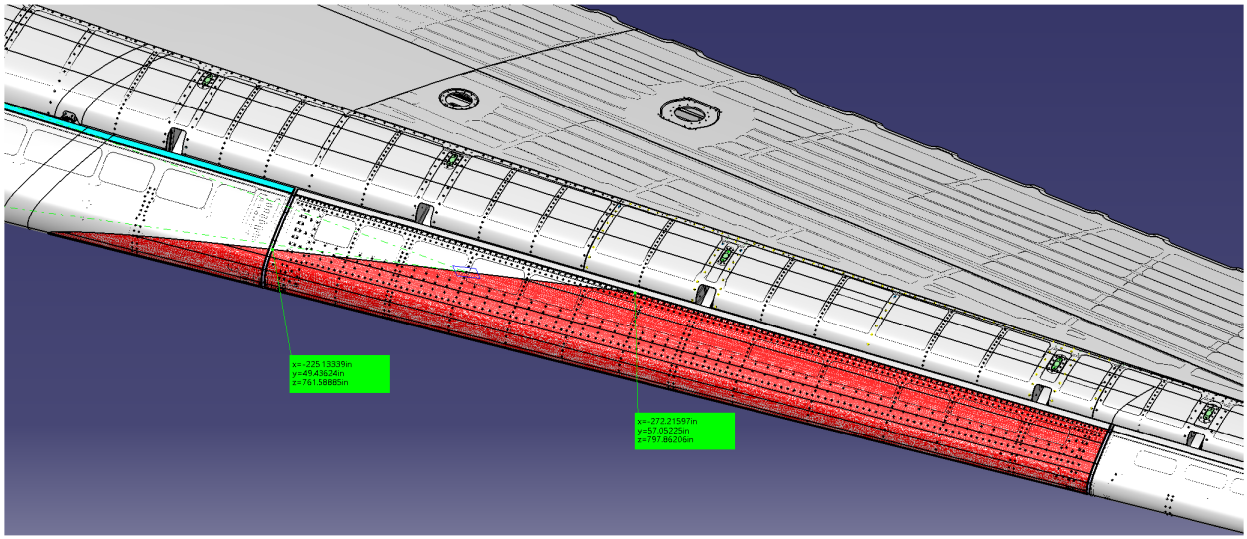

Figure 24. Left center slat slash mark location (MHI RJ Diagram)